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ABSTRACT

The potential overlap of teaching and scholarship (research) in mathematics education is described. It is suggested that educational or content research results can play an important role in an undergraduate methods course for elementary mathematics. The typical student is a prospective elementary school teacher, usually with a minimal background in mathematics. Examples of using research results in a university methods class are grouped into the following categories: mathematical research, general educational research, mathematics education research literature, and the instructor's personal research and experiences. The university instructor should be aware of major new developments in the content field and convey them to students. Cognitive psychology and research on teaching behaviors are among the general research areas that are valuable to the teacher, along with research on mathematics education. Research results gathered from the teacher's own work may be related to students, and the teacher can also talk to students about research projects they might do in their teaching situations. Anecdotal examples from working with mathematics learners may also be shared. (SW)

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USING RESEARCH RESULTS IN THE UNIVERSITY CLASSROOM

by

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Introduction

Faculty members at major universities are oftened evaluated in three categories of achievement. They are: teaching, scholarship, and service. Although seen by many as seperate and distinct entities, these areas often and in fact should overlap a great deal. The purpose of this paper is to describe the potential overlap of teaching and scholarship (research) in the author's area of expertise (mathematics education).

As the subject for this analysis, consider the undergraduate elementary methods course in mathematics. The typical student is prospective elementary school teacher, usually with only a minimal background in mathematics. The purpose of the course is to provide the soon-to-be teacher with pedagogical tools to be used to teach mathematics to young children.

Many would say that this is a formidable task and surely should concentrate on the "nuts and bolts" of classroom practice. While this notion has some merit, it is also the case that educational or content research results have an important role to play in this class. In the paragraphs that follow, examples of how research results can find their way into the university methods class will be explored. The examples can be grouped according to category. The five categories under consideration are:

1) Mathematical research;
2) General educational research;
3) Mathematics education research literature;
4) Personal research of the instructor; and
5) Personal experiences of the instructor.

Mathematical Research

Because mathematics is the content topic, it is incumbent upon the university instructor to be aware of major new developments in the content field. The ability to cite recent developments in the field (such as the discovery of a new, very large prime number via computer technology or the solution of the famous Four-Color Problem (Appel and Haken, 1977)) helps to provide students with a better understanding of the dynamic nature of the content field in which they will be teaching. Teachers of content areas such as mathematics should be cognizant of the fact that new knowledge is being developed everyday.

General Educational Research

The world of educational research is a vast and complex one. However specialized one's interests are, there are constantly new results of a general nature which seems to speak to all those involved in the educational enterprise. Whether one looks at the cognitive psychology, of a Piaget (Flavell, 1963), Gagńe (1962) or an Ausubel (1961) to discuss human learning characteristics or the work of Dunkin and Biddle (1974) to investigate teaching behaviors, it is important to know about the process of education (Bruner, 1960). As well as human characterists and teaching, there are several other areas such as individualized instruction, information processing, and instructional technology. All these areas have something to offer for those who would work with prospective teachers.

Mathematics Education Research Literature

Each year there are numerous research conducted which deal with the many varied aspects of mathematics education. The university instructor would do well to keep abreast of these new findings as they relate to the elementary school mathematics classroom. For example, one might be inter-

ested in the impact of the use of hand-held calculators in the elementary school mathematics classroom (Roberts, 1980). Several sources are available to the interested educator for reviewing recent research developments (Suydam, 1985).

Personal Research Experience

As the author teaches preservice elementary mathematics teachers, he often uses research results gathered in his own work. For example, results regarding how children require mathematical concepts related to measurement, (Lamb, 1975). As a follow-up, the author also talks to students about conjectured research projects or small-scale projects they might do in their teaching situations (Lamb, 1980).

Personal Experiences

Since education involves working with human beings, it seems useful for the instructor to share experiences of less than an experimental nature. As a former teacher of mathematics, the author uses anecdotal examples from his work with learners of mathematics. These provide my students with a "real-world" look at the teaching of elementary school mathematics.

Conclusion

Although one could give several more examples for each category, it is hoped that the above discussion makes a clear point. Especially in education, it is crucial that students (prospective educators) be aware of the dynamic status of the field of education as well as the current status of their chosen content field (mathematics). As instructors of such young people, it behooves the college faculty member to drive home the point that the only constant in the field of education is change. Using current research results in our classes can help us to do just that!

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